भारतीय मानक
Indian Standard

IS 9917 : 2022

कैल्शियम से बने
तप्त-स्थायी ग्रीज — विशिष्टि

(दूसरा पुनरीक्षण)

Calcium Base Heat Stable Grease — Specification

(Second Revision)

ICS 75.100

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भारतीय मानक ब्यूरो
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Lubricants and their Related Products Sectional Committee, PCD 25

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards after the draft finalized by the Lubricants and their Related Products Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

This standard was first published in 1981 and was revised for the first time in 1993.

This specification covers requirements for calcium base heat stable grease for use of certain industries, such as steel plants and railways. While preparing this standard, considerable assistance has been taken from the British Timken Specification for grease for normal temperature automotive, medium duty industrial and railway rolling stock axle box applications, issued by British Timken, Duston, Northampton, England (U.K.).

In the first revision, requirements for drop point and corrosion test were modified. An additional requirement for water stability in the presence of water has also been added to reflect the better quality of the material generally available in the market.

In this second revision, the free organic acidity and water content are reduced from 1.0 percent to 0.5 percent and clause for references and marking have been updated.

The composition of the committee responsible for the formulation of this standard is given in Annex D.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

CALCIUM BASE HEAT STABLE GREASE — SPECIFICATION

(Second Revision)

1 SCOPE

This standard prescribes the requirements and the method of sampling and tests for calcium base heat stable grease suitable for use in bearings operating in wet conditions.

2 REFERENCES

The following Indian Standards contain provisions which through reference in this text constitute the provisions of the standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
1447 (Part 3) : 2021	Methods of sampling of petroleum and its products: Part 3 Method of sampling of semi-solid and solid petroleum products (*second revision*)
1448	Methods of tests for petroleum and its products
(Part 4/Sec 2) : 2021	Ash from grease, sulphated ash and water soluble ash (*fourth revision*)
(Part 25/Sec 1) : 2018/ ISO 3014 : 1994	Transparent and opaque liquids, Section 1 Determination of kinematic viscosity and calculation of dynamic viscosity (*second revision*)
(Part 40) : 2015/ ISO 3733 : 1999	Petroleum products and bituminous materials — Determination of water — Distillation method (*fourth revision*)
(Part 51) : 1963	Copper strip corrosion test for lubricating greases
(Part 52) : 2017/ ISO 2176 : 1995	Drop point (*second revision*)
(Part 53) : 1979	Determination of acidity and alkalinity of greases (*first revision*)
(Part 59) : 1991	Determination of mineral oil content in greases (*second revision*)
(Part 60) : 1994	Consistency of lubricating greases by cone penetrometer (*second revision*)
(Part 62) : 1974	Heat stability of greases (*first revision*)
(Part 69) : 2019/ ISO 2592 : 2017	Determination of flash and fire points — Cleveland open cup method (*second revision*)
2062 : 2011	Hot rolled medium and high tensile structural steel — Specification (*seventh revision*)

3 REQUIREMENTS

3.1 General

The grease shall be smooth, homogeneous preparation, uniform in consistency and free from objectionable odour, deleterious materials and other impurities, such as rosin, rosinates, tar oil, grit and fillers of any description. It shall not show any sign of breakdown hardening or tendency of the constituents to separate. It shall also be free from grains.

3.2 Composition

The grease shall be prepared from refined mineral lubricating oils and calcium soaps of fatty acid. Additives may be added, if agreed between the purchaser and the supplier.

3.2.1 The mineral oil extracted from the grease by method 'A' prescribed in IS 1448 (Part 59) shall comply with the following requirements:

Characteristic	*Requirement*	*Method of Test, Ref to Part of IS 1448*
Kinetic viscosity in mm^2/s at 40 °C	90 to 110	(Part 25/Sec1)
Flash Point, (COC) °C, *Min*	178	(Part 69)

NOTE — 1 cSt = 1 mm^2/s.

3.3 Keeping Properties (Shelf Life)

The keeping quality of the material shall be such that when stored in original sealed containers under normal conditions, it shall retain the properties given in the specification for not less than one year from the date of manufacture of the product.

3.4 The material shall also comply with the requirements given in Table 1 when tested according to the methods given in col 4 of Table 1.

4 PACKING AND MARKING

4.1 Packing

The material shall be packed in securely closed metal or any other suitable container as agreed to between the purchaser and the supplier.

4.2 Marking

4.2.1 Material shall be marked with the following information:

a) Name and type of the material;
b) Manufacturer's name, initials or trade-mark, if any;
c) Net mass of material;
d) Identification in code or otherwise to enable the lot of consignment or manufacture to be traced back from records; and
e) Any other statutory requirements.

4.2.2 *BIS Certification Marking*

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

5 SAMPLING

Representative samples of the material shall be drawn as prescribed in IS 1447 (Part 3).

5.1 Number of Tests — All characteristics given in the specification shall be tested on the composite sample.

5.2 Criteria for Conformity — The lot shall be declared as conforming to the requirements of the specification if all the test results on the composite sample meet the relevant specification requirements of this standard.

Table 1 Requirements for Calcium Base Heat Stable Grease

(*Clause* 3.4)

Sl No.	Characteristic	Requirement	Method of test, ref to Part of IS 1448/Annex
(1)	(2)	(3)	(4)
(i)	Consistency of the worked grease at 25 ± 0.5 °C		(Part 60)
	a) 60 strokes	220 to 250	
	b) 10,000 strokes	Shall not differ by more than 30 units from the 60 strokes value	
(ii)	Drop point, °C, *Min*	130	(Part 52)
(iii)	Free organic acidity, (as oleic acid), percent by mass, *Max*	0.5	(Part 53)
(iv)	Free alkalinity (as calcium hydroxide), percent by mass, *Max*	0.15	(Part 53)
(v)	Corrosion test at 100 °C, 24 h	Bright copper and steel strips shall not show any discolouration after being partly submerged in the grease	(Part 51)*
(vi)	Heat stability at 120 ± 1 °C	No sign of breakdown, marked change in consistency or separation of oil	(Part 62) Method A
(vii)	Water content, percent by mass, *Max*	0.5	(Part 40)
(viii)	Heat stability test, 48 h	No oil separation	A
(ix)	Sulphated ash, percent by mass, *Max*	5.0	(Part 4/Sec 2)
(x)	Resistance to water	Shall not emulsify with cold or hot water	B
(xi)	Working stability in presence of water	– 10 to + 50	C

* For steel strips, the temperature of test and size of strips should be the same as that be made of mild steel conforming to IS 2062.

ANNEX A

[*Table* 1, *Sl No.* (viii)]

HEAT STABILITY TEST

A-1 OUTLINE OF THE METHOD

25 g of grease is heated to 120 °C and held at that temperature for half an hour, then poured into a silica or glass tube which when cooled is suspended over a conical measure, graduated in ml in which the mineral oil that separates out in 48 h is collected.

A-2 PROCEDURE

A-2.1 A sample of 25 g of grease is placed standard Pensky Marten flash point open cup and heated at the rate of 6 °C/min to 120 °C. The grease is maintained at 120 ± 3°C for half an hour. During the heating and maintaining the grease at 120 °C it is to be stirred at the rate of 2 revolutions per second for alternate minute.

A-2.2 After the grease has been held at a constant temperature of 120 °C for half an hour, it is transferred into a silica or glass tube, approximately 75 mm long × 25 mm inside diameter, one end of which has been previously sealed with a rubber bung.

A-2.3 After half an hour atmospheric cooling, the bung is removed and the grease, supported by two pieces of flattened wire approximately 1.5 mm wide wound vertically round the tube, is suspended over a conical measure graduated in ml to collect the mineral oil that separates out in 48 h.

A-2.4 The grease shall be regarded to have passed the test, if there is no oil separation in 48 h.

ANNEX B

[*Table* 1, *Sl No.* (x)]

TEST FOR WATER RESISTANCE

B-1 PROCEDURE

B-1.1 A sample approximately 5 g of grease is placed in a 150 mm long × 25 mm inner diameter test tube. The test tube is then half filled with cold distilled water and held for half an hour with manual agitation after every 5 min. After half an hour, the grease is then examined for the formation of any emulsion with cold water.

B-1.2 The test tube and its contents are then slowly heated over a bunsen burner to near boiling point without agitation and the condition of the grease is again examined for any emulsion formation with hot water.

B-1.3 The grease shall be regarded to have passed the test, if no emulsion is formed with either cold or hot water.

ANNEX C

[*Table* 1, *Sl No.* (xi)]

TEST FOR WORKING STABILLITY IN PRESENCE OF WATER

C-1 OUTLINE OF THE METHOD

The working stability is determined after prolonged mechanical working of the grease in presence and absence of water and determining the difference in penetration of the two samples.

C-2 APPARATUS

Penetrometer, cone, grease worker and water bath as mentioned in IS 1448 (Part 60) and spatula.

C-3 PROCEDURE

C-3.1 Fill the grease worker cup with grease and assemble the worker as described in IS 1448 (Part 60) and mark it as sample 1.

C-3.2 Fill a second cup with grease level 10 ± 0.5 mm from the top. Add 31.9 ± 0.1 ml of distilled water. Pack the perforated plate and cover of the grease worker with the grease to the top of its stroke ensuring that the grease is flushed with the cover sheath. Open the vent and clear the hole through it using a straight piece of wire of suitable thickness, screw the cover sheath which seats on the rim of the cup. This cup now contains 10 percent of water by volume.

C-3.3 Take each sample in turn and press the perforated plate to the bottom of the cup with the vent closed and operate each worker mechanically to a total of 10 000 double strokes.

C-3.4 Open the vent and place the worker in the constant temperature bath at 25 ± 0.5 °C for one and half hour.

C-4 CALCULATLON AND REPORT

C-4.1 Calculate the mean of three determinations for each sample and report the difference between the mean for sample 2 and the mean for sample 1.

ANNEX D

(*Foreword*)

COMMITTEE COMPOSITION

Lubricants and their Related Products Sectional Committee, PCD 25

Organization	*Representative(s)*
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Automotive and Industrial Greases Subcommittee, PCD 25 : 3

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